

ART. I—*Victorian Holothuroidea, with descriptions of
New Species.*

BY E. C. JOSHUA.

(With Plate I.),

[Read 12th March, 1914.]



In the following paper fifteen species are dealt with, four of which are believed to be new to science. No attempt has been made to give a complete synonymy of each species, but a reference has been given to where such may be found. The author desires to express his thanks to Professor Spencer, the Director of the National Museum, Melbourne, for permission to make an examination of the specimens contained in its collection, in which all those dealt with are included; he also wishes to thank Mr. J. A. Kershaw, the Curator of the above institution, for much kindness and attention received from him. To Dr. T. S. Hall, of the Biological department of the University of Melbourne, his thanks are due for most useful guidance given on many occasions, particularly in connection with the literature of the subject. Very valuable assistance in collecting has been given him by Mr. H. Roebuck, a Geelong naturalist, and by Mr. James Wilson, in the making of arranged slides of the spicules found in some of the species. He particularly desires to thank Professor Dendy, of King's College, London, for very kindly comparing specimens of *Chiridota dunceduncensis*, Parker, with that of the Author's *Trochodota allani*.

Taxonomy.

The system of classification adopted in this paper is that of Ludwig (16), but Ostergren's revision of the Paractinopoda is used in dealing with this order.

The genus *Taeniogyrus* is discarded; the writer is of opinion that the genus qua genus never had any real existence. Semper's language in dealing with it conveys little more than the suggestion for a genus, and in his catalogue and synonymy he entirely ignores it. Clark (3) has taken it seriously, and I followed him in describing *Trochodota allani*, but more recently the examination of numerous specimens of this species has definitely shown me that

the wheel papillae and aggregations are not constantly met with, and that in numerous individuals the distribution of the wheels could only be described as scattered everywhere, thus combining in one species the characters of two genera. So great an authority as Dendy will have neither of these genera, and adheres to the original genus *Chiridota* for the reception of all these wheel-bearing forms. Personally, I think that the genus *Chiridota* may be usefully separated from the sigmoid bearing genera on account of its members exhibiting bracket shaped ossicles; there would appear to be no species having an ossicle which could be described as intermediate in form between a signum and a bracket.

Verrill's genus *Leptosynapta* is used for the species *dolabrifera* Stimpson, Clark (3) having definitely pointed out the propriety of this course.

The following is a list of the species dealt with:—

- Stichopus mollis* (Hutton).
- Stichopus simulans* Dendy.
- Cucumaria inconspicua* Bell.
- Cucumaria mutans*, sp. n.
- Phyllophorus dearmatus* Dendy.
- Phyllophorus vestiens*, sp. n.
- Colochirus spinosus* (Quoy and Gaimard).
- Colochirus doliolum* (Pallas).
- Psolidium convergens* R. Perrier.
- Caudina chilensis* (J. Muller).
- Leptosynapta dolabrifera* (Stimpson).
- Chiridota gigas* Dendy.
- Chiridota ingens*, sp. n.
- Trochodota allani* (Joshua).
- Trochodota roebucki*, sp. n.

GENUS STICHOPUS.

STICHOPUS MOLLIS (Hutton).

For synonymy see

- 1907. *Stichopus mollis*, Dendy and Hindle (5); and
- 1887 *Holothuria victoriae*, Bell (1);
- 1913. *Stichopus mollis*, Erve Willy (8).

After reading Bell's account of his *Holothuria Victoriae*, and examining the figures he gives of its spicules, I have no hesitation in synonymising it with Hutton's species.

This Holothurian is common in Port Phillip Bay, and at numerous localities on the coast. Young specimens may frequently be met with on rocks just below low water mark, the older animals prefer deeper water.

STICHOPUS SIMULANS Dendy and Hindle.

For synonymy see

1913. Erwe Willy (8).

On several occasions I have made preparations of the skins of Holothurians, which, before seeing Dendy and Hindle's paper, I regarded as specimens of *Stichopus mollis*; they, however, exhibited the peculiar dichotomoid ossicles described by Dendy (4), (5), in addition to the ordinary spiculation, and must therefore be regarded as belonging to the above-named species.

GENUS CUCUMARIA.

CUCUMARIA INCONSPICUA Bell (1).

I have collected numerous specimens of this little holothurian at Flinders; the form described by Bell is usually found between tide marks, but it is also met with in water of from five to ten fathoms in depth—these latter specimens do not quite accord with Bell's account of the distribution of the podia in his type—in the strictly littoral forms the pedicels may be described as ventrally confined to the radii, and dorsally almost so; but in those collected in deeper water, the arrangement in rows is quite lost dorsally, but the ventral disposition remains the same; the result is an animal whose external appearance is identical with *Cucumaria parva*, Ludwig; the spiculation, however, is unaltered, and the details of the internal anatomy are the same as in the shore specimens. In addition to the large cruciform bodies I found numerous small rods branched at the ends, and very numerous minute ($32\ \mu$) dichotomously foliaceous ossicles, which in some individuals occur in dense crust-like patches. This animal has the curious brood-sheltering habit noticed by Ludwig (17) in *Cucumaria parva*. I have never seen the young actually adhering to the parent, but on placing some living specimens in a narcotic solution, after removing the larger animals, a number of minute individuals of from 1 to 3 mm. in length were found at the bottom of the receptacle; these can only be assumed to have become detached from the older specimens. The spiculation of the young animals agreed with that of their parents.

I think that there can be no doubt that this species is very close to, if not identical with Ludwig's *Cucumaria parva*. It is to be noted that Ludwig (17) has pointed out that so far as *parva* is concerned, the process of reproduction may occur before complete development of the spicules has been attained.

CUCUMARIA MUTANS, sp. n. (Plate I., Figs. 1 (a), (b), (c), (d).)

Localities.—Port Phillip Bay, Westernport Bay, and Victorian Coast line.

Length 60 mm., greatest width 20 mm., tapering gradually to both posterior and anterior ends. Tentacles, ten of almost equal length, pedicels confined to the radii. In the three ventral radii they occur in five closely disposed rows; in the two dorsal radii in three rows. The calcareous deposits consist of numerous tables, 80 μ in diameter, with three large central holes, and a spire having three rods, joined by a transverse beam, and terminating in six or seven spinous projections. The calcareous ring has ten pieces of about equal length, without posterior prolongations. The internal anatomy shows no peculiarities; colour, degraded white; tentacles, black.

This is perhaps one of our commonest Holothurians—the young forms being met with between tide marks in all the localities in which I have collected. It is to be noted, however, that these young forms differ very materially from the mature animal; their colour is a deep blue black, and the tables, which are crowded in the older animal, are few and far between in the young, and are usually devoid of the spire.

Though a very typical Cucumarian, its spiculation would appear to specifically distinguish it from any previously described species.

GENUS PHYLLOPHORUS.

PHYLLOPHORUS DEARMATUS Dendy.

I collected a single specimen of this animal at Flinders, and there is another from Westernport Bay, in the collection of the National Museum, Melbourne; Mr. Roebuck obtained two at Torquay. The absence of spicules in the perisome would appear to be not uncommon in members of this genus. A species about to be described exhibits the same peculiarity, and another species at present undescribed, found in South Australia, is quite devoid of calcareous bodies in the perisome, with the exception of the cribri-

form plates at the end of the podia (present also in *dearmatus* and *vestiens*). Perfectly fresh material was used for examination, so that the possibility of destruction by an acid preservative is untenable.

PHYLLOPHORUS VESTIENS, sp. nov. (Plate I., Figs. 2 (a), (b), (c), (d).)

Localities.—Port Phillip Bay, Westernport Bay, and Victorian coast line.

Size, 70 × 25 mm., fusiform flexed dorsally. Tentacles 20, ten outer, alternating with five pairs of inner, the outer dorsal tentacles are about three times the length of the ventral, the tentacles forming the inner crown do not vary in size. Tube feet are thickly disposed over the whole surface of the body, no arrangement in rows being anywhere visible. The calcareous ring (Fig. 2) consists of ten very irregular and complex processes, deeply imbedded in cartilage; the radial pieces have prolongations posteriorly. In the perisome there are no calcareous deposits other than large cribriform plates, at the extremities of the tube feet, The tentacles are provided with rods, having expanded ends pierced with several holes; they also exhibit irregularly distributed patches of small foliaceous ossicles (Fig. 2a, 2b, c, d, e). Polian vessel and madreporal canal, single. The genitalia consist of numerous comparatively short unbranched coeca, springing from each side of the genital duct, for a distance of about 30 mm.; in the type they contain ova, and are of a bright yellow colour.

The body colour of the animal is a brownish pink; tube feet, white; tentacles, black. In life, it covers itself with stones, shells and shore debris.

This Holothurian is of frequent occurrence along our coast line, though its habit of coating itself with debris would often protect it from observation. The strong dorsal flexure invariably noted in all spirit specimens of this genus, would appear to be a post mortem contraction, as I have, in this species at least, never seen it in life; the animal simply adheres and accommodates itself to the surface to which it may be attached.

GENUS COLOCHIRUS.

COLOCHIRUS SPINOSUS (Quoy and Gaimard).

For synonymy, see

Theel (19), and

1897. Whitelegge (20), *Colochirus spinosus*.



There are five typical specimens of this species in the collection of the National Museum, Melbourne. They are presumed to have been collected in Victorian waters, but exactly when and where is not indicated. Whitelegge (20) records the animal from Port Jackson, N.S.W.

COLOCHIRUS DOLIOLUM (Pallas).

For localities and synonymy, see

Erwe Willy (8).

Young specimens of this *Colochirus* are frequently found from the shore down to about five or ten fathoms. Their spiculation exactly agrees with the mature form, but the dark, brown, pigmented areas, which occur in the older animals, are only represented by very faint yellow bands, which rapidly lose their colour in spirits.

GENUS PSOLIDIUM.

PSOLIDIUM CONVERGENS Perrier.

1905. Perrier R. (18), *Psolidium convergens*.

Locality.—Flinders.

I secured three specimens of this apparently rare species at Flinders; they agreed well with Perrier's description (18).

GENUS CAUDINA.

CAUDINA CHILENSIS (J. Muller).

For synonymy, see

Clark (3).

Localities.—Westernport Bay, Mordialloc.

The above localities furnished two specimens which, though differing widely in appearance, I assign to this species. The larger, picked up after a storm at Mordialloc, measures 100×40 mm.; it tapers sharply posteriorly, but cannot be described as caudate, colour yellow, blotched with brownish pink; the spicules are more massive than those typical of *chilensis*, the holes being smaller, and the cross being frequently lost by fusion with the disc. The whole ossicle seems to have undergone a process of hypertrophy.

The other specimen, from Westernport Bay, is fairly typical. Some temptation existed to regard these two specimens as belonging to distinct species, but fortunately the writer has recently had an opportunity of examining a collection of over forty speci-

mens of *chilensis*, from the South Australian Public Museum, in which numerous gradations between the typical form and that above described are recognisable.

GENUS LEPTOSYNAPTA.

LEPTOSYNAPTA DOLABRIFERA (Stimpson).

For synonymy, see

Clark (3).

Localities.—Port Phillip Bay, Westernport Bay, Wilson's Promontory, Torquay, Corio Bay, Flinders.

The species is common. I have met with it from low water mark down to twenty fathoms. There is no doubt in my mind that if *dolabrifera* was collected at a locality north of the equator, it would be identified without hesitation as *inhaerens*. The only slight, but fairly constant difference, that I could detect, was in the width of the anchor plates, which in *dolabrifera* are slightly narrower. The calcareous ring may be quite without neural perforations, or it may have any number up to five. The colour may vary from rose to white, and one specimen from Wilson's Promontory was a deep purple black.

CHIRIDOTA GIGAS Dendy.

Localities.—Wilson's Promontory, Torquay.

There is one specimen in the Museum collection. This was collected by Mr. Kershaw, at Wilson's Promontory; it is very considerably contracted, measuring 70 mm. by 15 mm., the integument being much wrinkled transversely, and quite opate. Mr. Roebuck has twice met with the animal at Torquay. On the last occasion he collected six specimens on a far outlying reef, which is exposed only on the occasion of an exceptionally low tide. He gave me two excellent specimens, one of which, in spirits, measures 15 cm. in length. Mr. Roebuck describes the animal in life as being of very handsome appearance, bright scarlet in colour, with dense, white, prominent papillae. A large specimen is capable of extending itself to a length of from eighteen inches to two feet. When handled, they are very prone to separate themselves into two or three pieces. The description of Dendy and Hindle (5) rendered the identification easy, but the difference of the spacing of the radial muscles, noticed by these authors, cannot, I think, be regarded as a constant character.

I found that it varied not only in different specimens, but in different areas of the same individual. In some cases one of the muscles would be divided in two for some part of its length; I think that both this and the other condition referred to must be assigned to the state of contraction of the circular muscles. The arrangement of the wheel papillae is subject to variation; they frequently occur in all the radii. The polian vessels were very numerous and variable in size in the animals I opened.

CHIRIDOTA INGENS, sp. n.

See Hall (9).

Dr. Hall very kindly placed at my disposal a slide containing the *Chiridota* spicule, referred to in the above paper. It has been presumed to be a tertiary fossil, and I am inclined to think rightly so. The wheel is exceptionally large, 200 μ in diameter, and of the usual *Chiridota* character. Although collected from a situation in close proximity to the sea, it differs from the ossicle peculiar to the two *Chiridotidae*, found in the locality, viz., *C. gigas*, and *T. roebucki*; the wheels of the former average 112 μ in diameter, and of the latter, 80 μ . In view of the circumstances under which it was found, I propose regarding the species as new. Hall's figure conveys a good idea of the structure of the spicule.

GENUS TROCHODOTA.

TROCHODOTA ALLANI (Joshua). (Plate I., Fig. 3).

Taeniogyrus allani Joshua (11).

Chiridota allani Dendy (7).

Localities.—Port Phillip Bay, Westernport Bay, Corio Bay.

This species is extraordinarily abundant on the sludge banks which form the greater part of the bottom of Port Phillip Bay. I have seen the dredge presenting the appearance of having been dragged through a mass of blood slime, from the thousands of this species adhering to it. Accompanying it, usually, are about one per cent. of *Leptosynapta dolabrifera*.

Professor Dendy very kindly compared specimens of this animal with those of *Chiridota dunedinensis* Parker, with which it was at one time thought to be identical, and was able to confirm the differences I pointed out in my original description of the species.

(II.) For reasons given in my note on Taxonomy elsewhere, I have abandoned my recognition of *Taeniogyrus* as a genus, and now assign this species to Ludwig's *Trochodota*.

Fig 1a

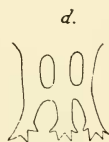
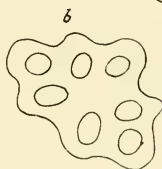
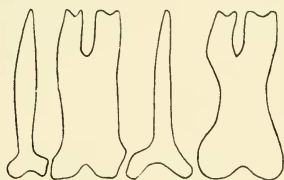


Fig 2

f

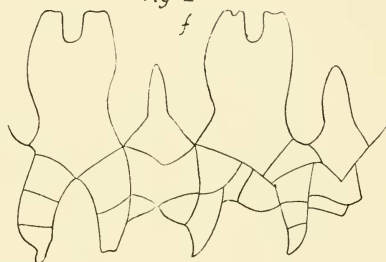
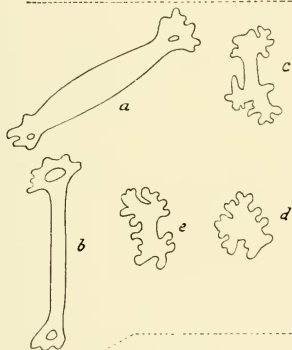


Fig 4a

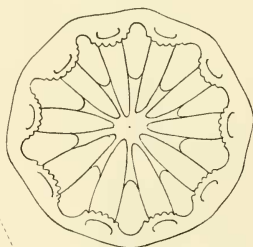
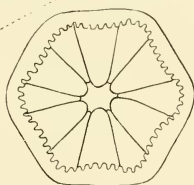
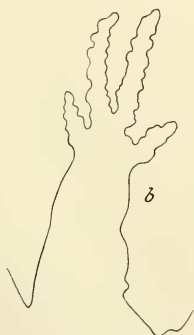


Fig 3





It is perhaps worth noting that *allani* frequently possesses wheels having more than six spokes. A figure of one showing 9 spokes is given. (Fig. 3).

TROCHODOTA ROEBUCKI, sp. n. (Plate I., Figs 4 (a), (b), (c).)

Locality.—Torquay.

Length 75 mm., breadth 6mm.; vermiform; colour, red. Ten tentacles, the two ventral of which are about half the length of the dorsal. Each tentacle has but four digitations, the two proximal of which are about one-third of the length of the distal. Deposits of two kinds, consisting of wheels measuring 80 μ in diameter, and sigmoid bodies (Figs. 4 a and c), 130 μ in length. The wheels have six spokes; the rim is hexagonal, its inner margin is coarsely serrated around its whole circumference. The sexes are apparently separate. The genital glands are unbranched. There is a single polian vessel, and one madreporal canal, which is fused to the dorsal mesentery. Mr. Roebuck collected several specimens from beneath stones at Torquay, and I have since met with them in the same locality. The animal would appear to be very close to the European species, *Trochodota venusta*, Semon. However, the proportion of the digitations on the tentacles and the form of the wheel ossicles differ from the illustrations of these structures, given respectively by Clark (3) and Ludwig (16) for *venusta*. I have, unfortunately, been unable to refer to Semon's original paper. The variation in the size of the tentacles is quite constant, and has been determined by the examination of numerous specimens, both in a living and preserved condition. They increase gradually in size from the venter to the dorsum.

BIBLIOGRAPHY.

- (1) Bell, F. Jeffrey.—“Holothuroidea, descriptions of new species.” Proc. Zool. Soc. London, June 21, 1887.
- (2) Bell, F. Jeffrey.—“Notes on Echinoderms collected in Port Phillip.” Ann. Mag. Nat. Hist., vol. ii., pp. 401-407. London, 1888.
- (3) Clark, H. L.—“The Apodous Holothurians.” Smithsonian Contributions, vol. xxxv. Washington, 1907.
- (4) Dendy, A.—“Observations on the Holothurians of New Zealand, with descriptions of four new species.” Journal Linnean Society, Zoology, vol. xxvi. London, 1898.